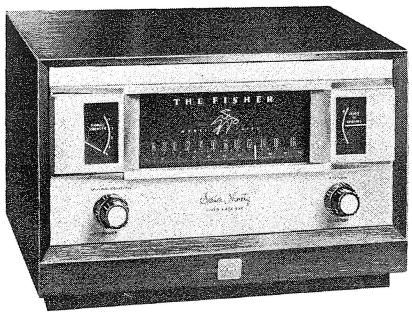
THE FISHER FM-90X SERVICE MANUAL



MODEL FM-90X

CHASSIS SERIAL NUMBERS
10001–39999 INCLUSIVE

FISHER RADIO CORPORATION · NEW YORK

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PARTS DESCRIPTION LIST

CAPACITORS

20% tolerance for all fixed capacitors, unless noted otherwise, or marked GMV (guaranteed minimum value).

Symbol	Description	Order No.
C1	Ceramic, 100 uuf, 600V	C-577-121
C2	Ceramic, 5 uuf NPO, 500V	CC20CH050F5
C3	Variable, tuning	C-551-119
C4	Ceramic, .005 uf GMV, 600V	CK62GP502V6
C5-8	Ceramic disc, 470 uuf, 500V	C-520-143
C9	Ceramic, 1 uuf	C-1786
C10	Ceramic, 47 uuf, 500V	CC21GP470M5
C11	Ceramic, 5 uuf NPO, 500V	CC20CH050F5
C12	Ceramic, 1800 uuf, 10%, 500V	CC26GP182K5
C13-17	Ceramic, .005 uf GMV, 600V	CK62GP502V6
C18	Ceramic disc, 470 uuf, 500V	C-520-143
C19	Chassis serial numbers 10001-19999, three capacitors wired in parallel:	
	C19-A: Ceramic, 5 uuf N1400, 500V	CC20VK050F5
	C19-B: Ceramic, 5 uuf N330, 500V	CC20SK050F5
	C19-C: Ceramic, 5 uuf NPO, 500V	CC20CH050F5
	Chassis serial numbers 20001-29999, two capacitors wired in parallel:	
	C19-A: Ceramic, 5 uuf N1400, 500V	CC20VK050F5
	C19-B: Ceramic, 13 uuf N030, 10%, 500V	CC20HG130K5
	Chassis serial numbers 30001-39999, two capacitors wired in parallel:	
	C19-A: Ceramic, 5uuf N750, 500V	CC20UJ050F5
	C19-B: Ceramic, 13 uuf N030, 10%, 500V	CC20HG130K5
C20	Not used	
C21, 22	Ceramic disc, 100 uuf, 600V	C-577-121
C23	Ceramic, 470 uuf, 500V	C-520-143
C24	Not used	
C25	Electrolytic, 10 uf, 50V	C-551-146
C26, 27	Ceramic, .005 uf GMV, 600V	CK62GP502V6
C28	Ceramic, 100 uuf, 600V	C-577-121
C29	Ceramic, .02 uf GMV, 600V	C-556-122
C30	Ceramic, 33 uuf, 500V	CC21GP330M5
C31	Ceramic, .02 uf GMV, 600V	C-556-122
C32	Ceramic, .005 uf GMV, 600V	CK62GP502V6
C33, 34	Ceramic, 300 uuf, 500V	CC21GP301M5
C35	Electrolytic, 10 uf, 50V	C-551-146
C36	Ceramic, .02 uf GMV, 600V	C-556-122
C37	Ceramic, 300 uuf, 500V	CC21GP301M5
C38	Ceramic, 1000 uuf, 10%, 500V	CC21GP102K5
C39	Ceramic, .02 uf GMV, 600V	C-556-122
C40	Ceramic, .005 uf GMV, 600V	CK62GP502V6
C41	Molded tubular, .01 uf, 600V	C-2747
C42	Electrolytic, four-section: C42-A: 40 uf, 250V C42-B: 40 uf, 200V C42-C: 40 uf, 200V C42-D: 40 uf, 200V	C-550-130
C43-45	Ceramic, .005 uf GMV, 600V	CK62GP502V6
C46	Ceramic, .047 uf, 200V	C68P473M2
C47	Ceramic, .0047 uf, 200V	C68P472M2
C48	Ceramic, .22 uf, 200V	C68P224V2
C49	Electrolytic, 1 uf, 250V	C-546-126
C50, 51	Ceramic, 470 uuf, 500V	C-520-143
C52	Ceramic, 24 uuf, 5%, 500V	CC21GP240J5
C53	Ceramic, 120 uuf, 10%, 500V	CC21GP121K5
C54, 55	Ceramic, .005 uf GMV, 600V	CK62GP502V6

COILS, CHOKES, TRANSFORMERS

Symbol	Description	Order No.
L1, 2	Coil, antenna matching	L-509-139
L3	Coil, antenna	L-551-131
L4	Coil, neutralization	L-520-178
L5	Choke, RF, 2.2 uh	L-50066-6
L6	Coil, RF	L-551-187
L7	Coil, oscillator	L-551-191
L8	Choke, RF, 2.2 uh	L-50066-6
L9	Not used	
L10	Coil assembly, limiter	L-551-121
L11	Choke, RF, 2.2 uh	L-3352
L12-14	Choke, filament	L-520-156
L15	Choke, RF, bifilar	L-509-140
L16	Antenna, dipole, with plug P1	AS-520-163
L17	Choke, RF, 2.2 uh	L-50066-6
T1	Transformer, power	T-630-113
Z1	Transformer assembly, first IF	ZZ-630-114
Z2, 3	Transformer assembly, 2nd and 3rd IF	ZZ-509-130
Z4	Transformer assembly, ratio detector	ZZ-592-170

RESISTORS, POTENTIOMETERS, RHEOSTATS

All fixed resistors in ohms, 10% tolerance, ½ watt, unless otherwise noted. K = Kilohm. M = Megohm.

Symbol	Description	Order No.
R1	Composition, 68K	RC20BF683K
R2-4	Composition, 470K	RC20BF474K
R5, 6	Composition, 100	RC20BF101K
R7	Composition, 2200	RC20BF222K
R8	Composition, 470K	RC20BF474K
R9	Composition, 100	RC20BF101K
R10	Composition, 330K	RC20BF334K
R11	Composition, 2200	RC20BF222K
R12	Composition, 1K	RC20BF102K
R13	Composition, 100	RC20BF101K
R14	Potentiometer, signal meter adj.	R-550-135-2
R15	Composition, 330K	RC20BF334K
R16	Composition, 1K	RC20BF102K
R17	Composition, 8200	RC20BF822K
R18	Composition, 150K	RC20BF154K
R19	Composition, 470	RC20BF471K
R20	Not used	
R21	Potentiometer, tuning meter adj.	R-520-149
R22	Composition, 1K	RC20BF102K
R23	Composition, 33K, 1W	RC30BF333K
R24	Potentiometer, muting control, with Switch S1	R-551-182
R25	Composition 220K	RC20BF224K
R26	Composition, 220	RC20BF221K
R27	Composition, 100K	RC20BF104K
R28	Composition, 1M	RC20BF105K
R29	Composition, 22K	RC20BF223K
R30	Composition, 15M	RC20BF156K
R31	Composition, 220K	RC20BF224K
R32	Composition, 1K	RC20BF102K
R33	Composition, 220K	RC20BF224K
R34	Composition, 100K	RC20BF104K
R35	Composition, 560K	RC20BF564K
R36	Composition, 3300	RC20BF332K
R37	Composition, 22K, 10%, 1W	RC30BF223K
R38	Composition, 2200	RC20BF222K
R39	Composition, 68K	RC20BF683K
R40, 41	Composition, 6800	RC20BF682K
R42	Wirewound, 220, 10%, 5W	R-551-137
R43	Wirewound, 910 tapped at 330: R43-A: 330, 5W R43-B: 580, 10W	R-551-138
R44	Composition, 2200	RC20BF222K
R45	Potentiometer, output level adj.	R-520-139
R46	Composition, 220K	RC20BF224K
R47	Composition, 2700	RC20BF272K
R48	Composition, 33K	RC20BF333K
R49	Composition, 1M	RC20BF105K
R50	Composition, 47K	RC20BF473K
R51	Composition, 2200	RC20BF222K
R52	Composition, 270	RC20BF271K
R53	Composition, 1K	RC20BF102K
R54	Composition, 1500	RC20BF152K

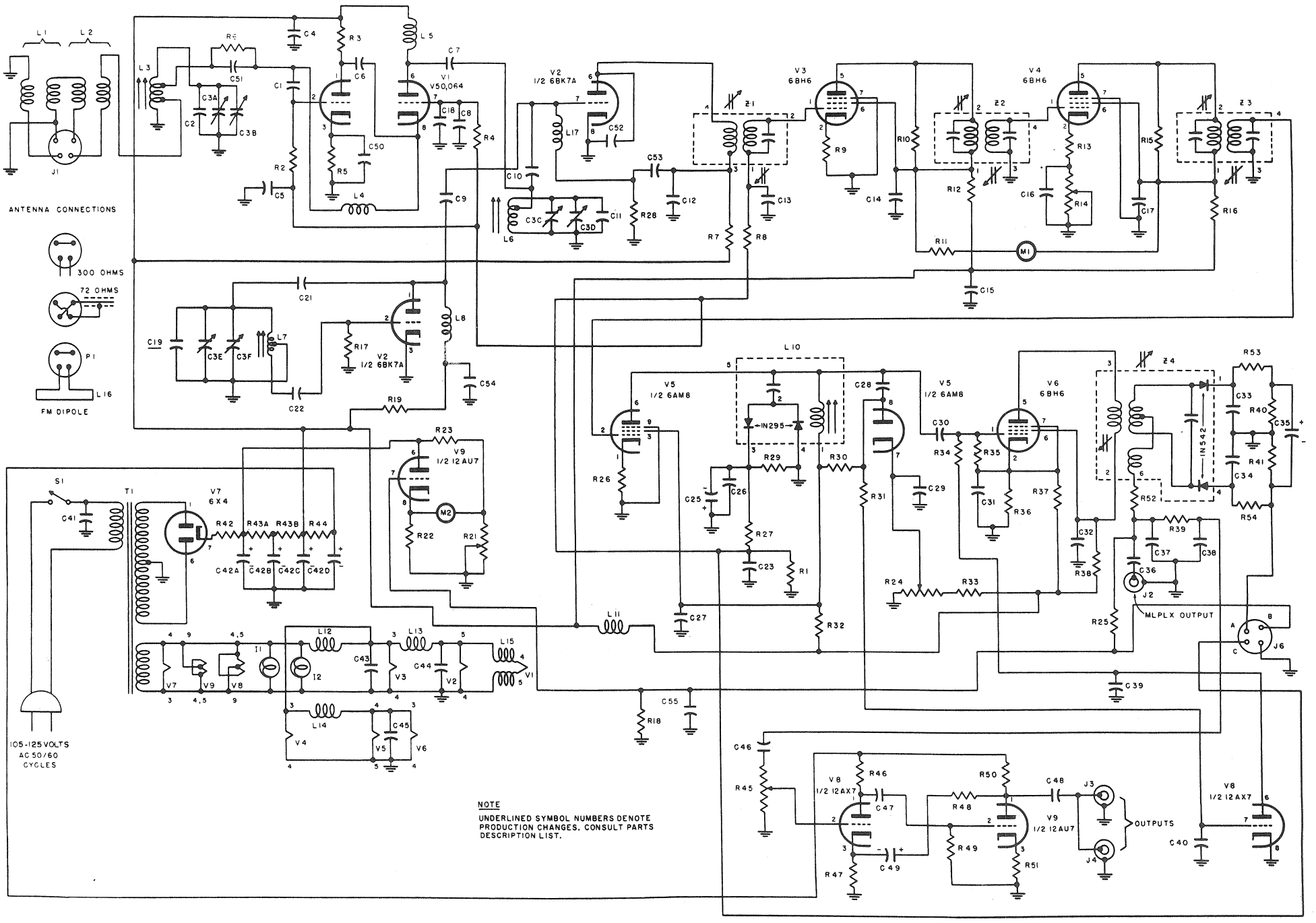
MISCELLANEOUS

Symbol	Description	Order No.
I1, 2	Lamp, window edge-lighting	J-520-137
J1	Jack, antenna input	I-563-145
J2-4	Jack, output	J-3143
J5	Not used	
J6	Jack, test	J-520-137
M1	Meter, signal strength	M-551-134
M2	Meter, center-of-channel tuning	M-551-169
P1	Plug, antenna input	P-520-138
S1	Switch, AC power	Part of R24
—	Shielded cable, 4 feet, with RETMA plugs	AS-50004-1

MECHANICAL PARTS

Description	Order No.
Front panel parts:	
Dial pointer	A-551-125
Dial glass	N-551-117
Dial glass corner bracket assembly	AS-520-154
Window, signal strength meter	N-551-193
Window, center-of-channel tuning meter	N-551-194
Escutcheon, with meter windows	AS-551-172
Dress panel (without escutcheon)	AS-630-109
Dress panel and escutcheon, assembled	AS-630-104
Knob, station selector	E-50049-5
Knob, muting control and AC power	E-50049-3
Mounting hardware:	
Machine screw, four required, 1 inch/10-32/RH	H121S472AA
Flat washer, four required	H106W122AA

SCHEMATIC DIAGRAM MODEL FM90-X



VOLTAGE AND RESISTANCE MEASUREMENTS

All readings below taken with vacuum-tube voltohmeter with respect to chassis ground. Set dial pointer at extreme low end of dial scale. All readings are subject to normal variation of 10%.

Resistance Reference Chart

Disconnect the chassis AC power cord. Discharge all electrolytic capacitors to chassis ground. Disconnect all cables to associated equipment. Readings are in ohms with respect to chassis ground, unless otherwise noted.

SYMBOL	TUBE SOCKET PINS								
TUBES	1	2	3	4	5	6	7	8	9
V1	15K	.5M	100	P	P	15K	.5M	100	0
V2	15K	8.2K	0	0	P	15K	1M	0	0
V3	.5M	100	P	0	15K	15K	0	NC	NC
V4	P	100-350b	P	0	15K	15K	0	NC	NC
V5	220	P	15K	P	0	15K	8K-600c	15M	0
V6	.5M	3K	P	0	15K	15K	3K	NC	NC
V7	70	NC	0	P	NC	70	15K	NC	NC
V8	250K	0-.5Me	2.7K	P	P	.5M	15M	0	0
V9	70K	1M	2.2K	0	0	15K	100K	30-60d	P

ELECTROLYTIC CAPACITORS	TERMINAL SYMBOLS	RESISTANCE
C42-A	■	15K
C42-B	◗	15K
C42-C	▲	15K
C42-D	NO MARK	15K

NOTES
- K Kilohm
- M Megohm
- P Reading less than 1 ohm.
- NC No connection.
- b Varies with setting of R14.
- c Varies with setting of R24.
- d Varies with setting of R21.
- e Varies with setting of R45.

Voltage Reference Chart

Set line voltage at 117 volts AC, 50-60 cycles. Readings are in DC volts with respect to chassis ground, unless otherwise noted. Use vacuum-tube voltmeter.

SYMBOL	TUBE SOCKET PINS								
TUBES	1	2	3	4	5	6	7	8	9
V1	97	N	1.4	6.3 AC	0	105	N	1.4	0
V2	97	.2-1.6a	0	0	6.3 AC	90	1-4a	0	0
V3	N	P	6.3 AC	0	97	97	0	NC	NC
V4	N	.7-1.4b	6.3 AC	0	97	97	0	NC	NC
V5	1.5	0	97	6.3 AC	0	97	0-3.5c	NPc	0
V6	4-15c	14-19c	6.3 AC	0	97-105c	97-105c	14-19c	NC	NC
V7	196 AC	NC	0	6.3 AC	NC	196 AC	185	NC	NC
V8	54	0	P	6.3 AC	6.3 AC	2.1-15c	Nc	0	0
V9	54	0	2	0	0	165	0	2.5-5d	6.3 AC

ELECTROLYTIC CAPACITORS	TERMINAL SYMBOLS	VOLTAGE
C42-A	■	165
C42-B	◗	145
C42-C	▲	105
C42-D	NO MARK	100

NOTES
- AC Reading in AC volts.
- P DC reading less than 1 volt positive.
- N DC reading less than 1 volt negative.
- NP Negative or positive DC reading less than 1 volt.
- NC No connection.
- a Varies with position of dial pointer.
- b Varies with setting of R14.
- c Varies with setting of R24.
- d Varies with setting of R21.

DIAL CORD REPLACEMENT INSTRUCTIONS

1. Remove chassis from cabinet. Remove all knobs. Carefully remove hexagonal nuts located behind channel selector and station selector knobs. Remove the two hexagonal screws holding the brass panel assembly. These are behind the front panel, near the upper corners. Carefully lift the brass panel away.

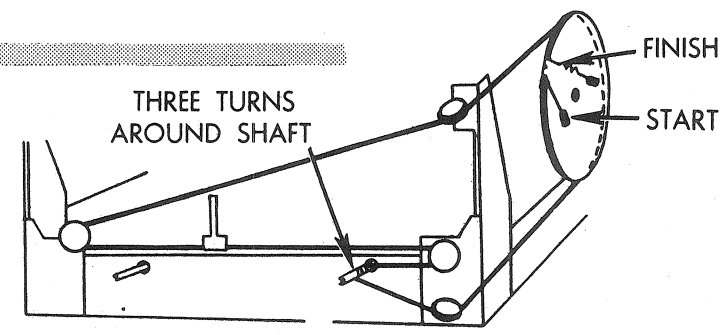
2. Remove the defective cord and dial pointer. Remove the dial glass panel by taking out the four hexagonal screws located along its front sides.

3. String the new dial cord as shown → Take three turns around the station selector shaft.

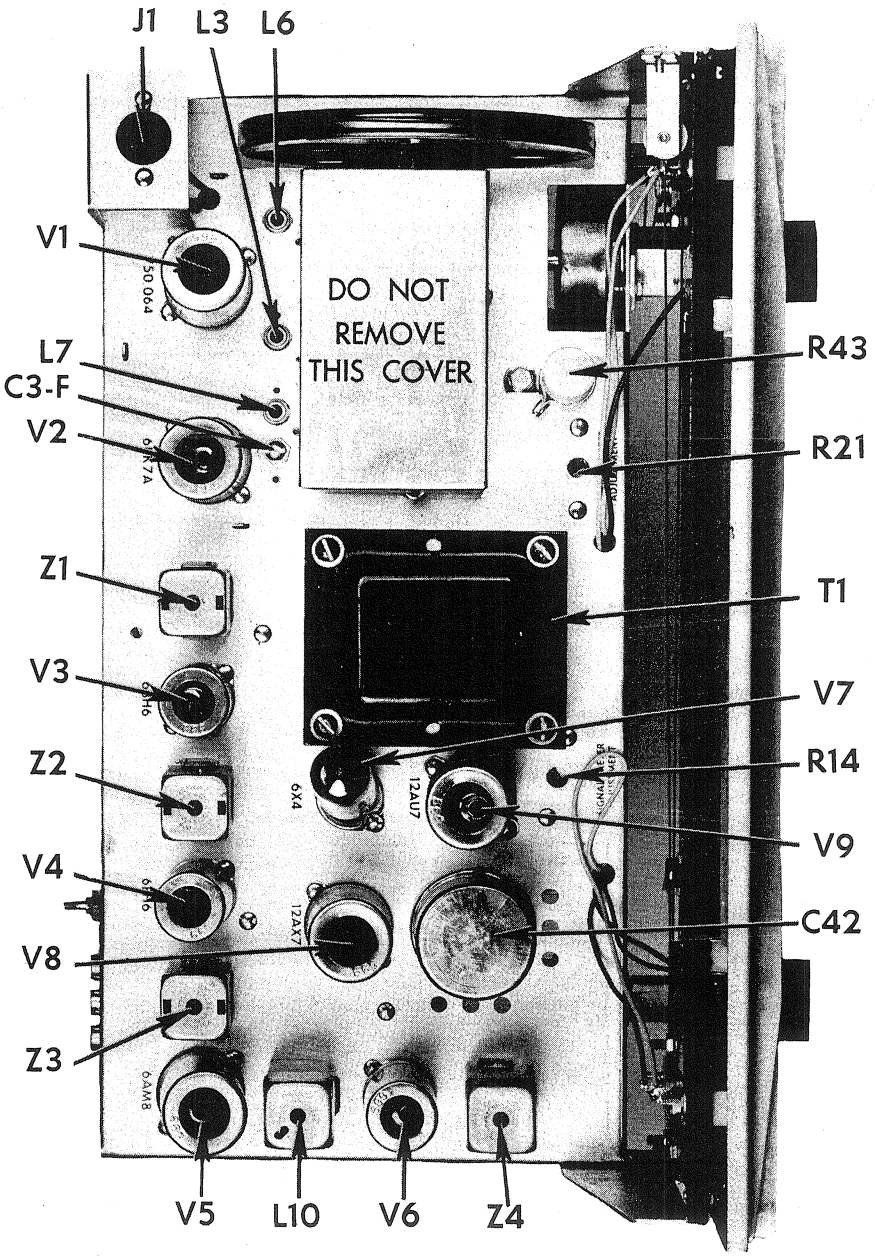
4. Replace the dial glass panel. Mount the dial pointer over a small piece of tape affixed to the cord.

5. Turn the station selector fully counterclockwise, and center the dial pointer directly under the zero mark on the logging scale.

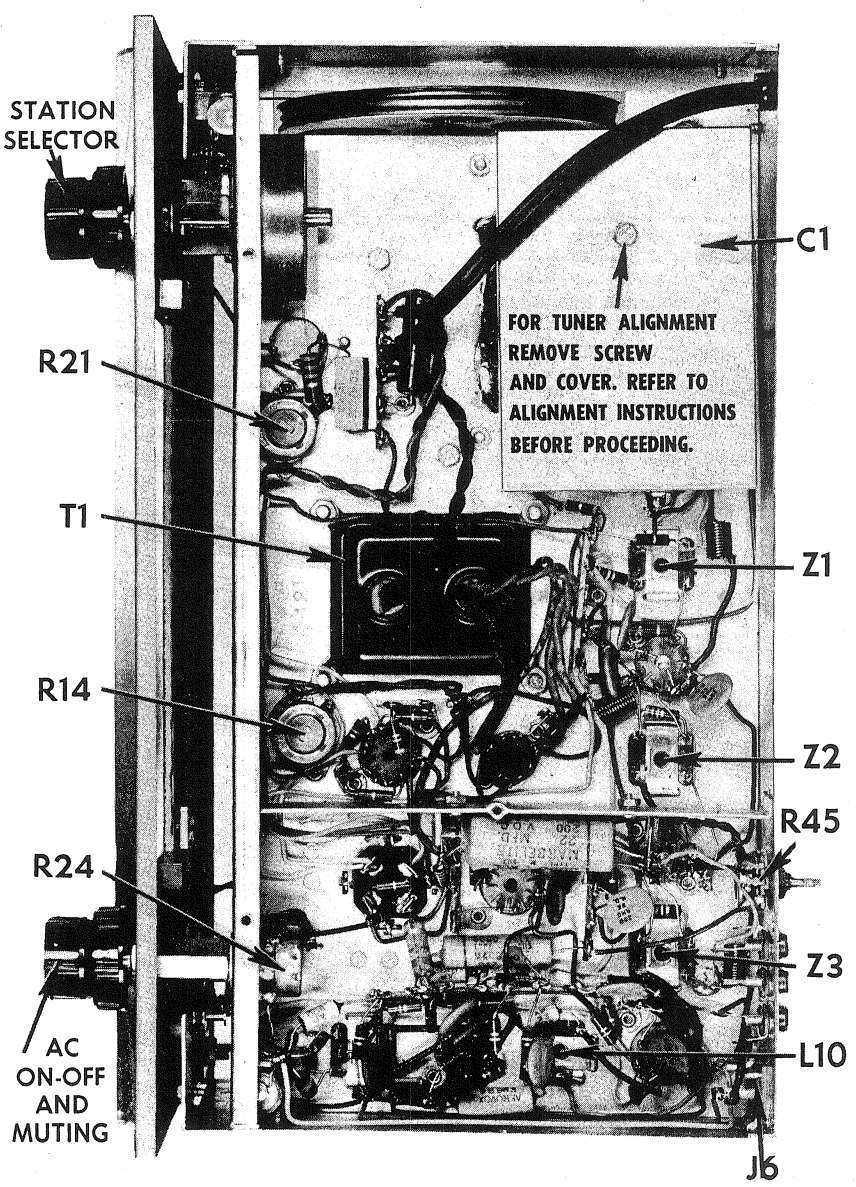
6. Secure dial pointer in place by applying household cement.



CHASSIS, TOP VIEW



CHASSIS, BOTTOM VIEW



ALIGNMENT INSTRUCTIONS

Read These Instructions With Extreme Care Before Attempting Alignment.

CHASSIS: Turn the Station Selector counterclockwise. The Dial Pointer should be at the zero mark on the Logging Scale. If not, re-set as described under Dial Cord Replacement. Disconnect antenna.

SIGNAL GENERATOR: Ground the signal generator to the Model FM-90X chassis. Set for minimum usable output to obtain meter indications.

INDICATING METER: A DC VTVM should be used for alignment.

ALIGNMENT: Allow the chassis and test instruments to warm up for at least 15 minutes. Adjust the line voltage to 117 volts AC, 50-60 cycles. Use fully insulated tools: a small slot-head screwdriver for C3-B, C3-D, and C3-F, a K-tran tool for Z1, Z2, and Z3, a hex tool for L3, L6, L7, L10 and Z4.

FM ALIGNMENT

STEPS	CHASSIS		SIGNAL GENERATOR			INDICATING METER		ALIGNMENT	
	MUTING CONTROL	DIAL POINTER	COUPLING	FREQUENCY	AUDIO MODULATION	TYPE	CONNECTION	CHASSIS ADJUSTMENT	METER INDICATION
1	Fully counterclockwise (minimum)	Point of no interference	Ungrounded tube shield of V2	10.7 MC	None	DC VTVM	J6, Pin C	Z1, Z2 and Z3 top and bottom, and L10 top	Maximum negative voltage
2	"	"	"	"	"	"	J6, Pin A	Z4 bottom	"
3	"	"	"	"	"	"	J6, Pin B	Z4 top	Zero reading on zero-center meter scale
4	"	106 MC	Two 120-ohm carbon resistors in series with leads to J1, 300-ohm antenna input	106 MC	400 cps at 22.5 KC dev.	"	J6, Pin C	C3-F	Maximum negative voltage
5	"	90 MC	"	90 MC	"	"	"	L7	"
6	"	106 MC	"	106 MC	"	"	"	C3-B and C3-D	"
7	"	90 MC	"	90 MC	"	"	"	L3 and L6	"
8	Repeat steps 4 through 7 at least once for proper dial calibration and maximum output.								

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